Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14FP2011** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Refrigeration, Air conditioning and Cold Storage** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | | 500 kg of fish at 30°C are kept in a bunker with 100 kg of blocks of ice at 0°C. It has taken 8 hours for the ice to melt to water at 0°C. Maintaining the same heat transfer rate, find what will be the equilibrium temperature of fish and water, and after how many hours this would occur? The specific heat of fish may be taken as 5.2 kJ/kg °C. | CO3 | 10 |
| b. | | The performance test of an A/C unit rated as 40 TR seems to be poor cooling. The test on heat rejection to atmosphere in its condenser shows the following.   * Cooling water flow rate 4 L/s * Water temperatures: in 30°C out 40°C * Power input to motor: 48KW (95% efficiency) * Calculate the actual refrigeration capacity. | CO2 | 10 |
| (OR) | | | | | |
| 2. | a. | | Illustrate with a neat sketch the working of vapor compression cycle | CO3 | 8 |
| b. | | Explain in detail about factors affecting COP of Refrigeration system | CO3 | 8 |
| c. | | Draw a skeleton description of pressure enthalpy chart | CO3 | 4 |
| 3. | a. | | Illustrate with a neat sketch construction and working of the following:   1. Plate freezer 2. Air Blast freezer | CO3 | 15 |
|  | b. | | Find the properties of air with 40°C dry bulb temperature and 28.5 g water/kg dry air moisture content at 1 atm | CO3 | 5 |
| (OR) | | | | | |
| 4. | a. | In efforts to conserve energy, a food dryer is being modified to reuse part of the exhaust air along with ambient air. The exhaust airflow of 10 m3/s at 70 °C and 30% relative humidity is mixed with 20 m3/s of ambient air at 30°C and 60% relative humidity. Using the psychrometric chart determine the dry bulb temperature and humidity ratio of the mixed air. | | CO3 | 10 |
|  | b. | Find the dew-point temperature, humidity ratio, humid volume, and relative humidity of air having a dry bulb temperature of 40°C and a wet bulb temperature of 30°C | | CO3 | 10 |
| 5. | a. | Describe the Good Manufacturing practice and Hygienic design considerations for chillers and food production systems. | | CO3 | 10 |
|  | b. | Write down the role of initial microflora, acidification and food type in food spoilage | | CO3 | 10 |
| (OR) | | | | | |
| 6. | a. | | Explain in detail about the following in construction of cold storage:   1. Draingage 2. Walls 3. Ceilings | CO3 | 15 |
|  | b. | | Write a note on HACCP. | CO3 | 5 |
| 7. | a. | | Describe in detail about types of refrigeration used in cold transport | CO3 | 10 |
|  | b. | | Write a note on cold storage and temperatures | CO3 | 5 |
|  | c. | | Write down the factors to be considered in door management | CO3 | 5 |
| (OR) | | | | | |
| 8. | a. | | Describe the steps involved in cold storage design in details with diagrams wherever necessary | CO3 | 20 |
|  | | | **Compulsory:** |  |  |
| 9. | a. | | Explain in detail about cold chain management in international market | CO3 | 10 |
|  | b. | | Describe the temperature management and other factors to be considered in Cold chain management | CO3 | 10 |

ALL THE BEST